

## CLAIMS

1. An aggregate of nanofibers made of a thermoplastic polymer, wherein single fiber fineness by number average is in a range from  $1 \times 10^{-7}$  to  $2 \times 10^{-4}$  dtex and 60%, in fineness ratio, or more of single fibers are in a range from  $1 \times 10^{-7}$  to  $2 \times 10^{-4}$  dtex in single fiber fineness.

2. The aggregate of nanofibers according to claim 1, having a morphology like filament-yarn and/or a morphology like spun yarn.

3. The aggregate of nanofibers according to claim 1, wherein the single fiber fineness by number average is in a range from  $1 \times 10^{-7}$  to  $1 \times 10^{-4}$  dtex and 60%, in fineness ratio, or more of single fibers are in a range from  $1 \times 10^{-7}$  to  $1 \times 10^{-4}$  dtex in single fiber fineness.

4. The aggregate of nanofibers according to claim 1, wherein 50%, in fineness ratio, or more of single fibers that constitute the aggregate of nanofibers are in a section having a width of 30 nm in diameter of the single fibers.

5. The aggregate of nanofibers according to claim 1, wherein the thermoplastic polymer comprises a polymer made through polycondensation.

6. The aggregate of nanofibers according to claim 1, wherein the thermoplastic polymer has a melting point of 160°C or higher.

7. The aggregate of nanofibers according to claim 1, wherein the thermoplastic polymer comprises one selected from among polyester, polyamide and polyolefin.

8. The aggregate of nanofibers according to claim 1, that has a strength of 1 cN/dtex or higher.

9. The aggregate of nanofibers according to claim 1, that has a ratio of moisture adsorption of 4% or higher.

5        10. The aggregate of nanofibers according to claim 1, that has a rate of elongation at absorbing water of 5% or higher in the longitudinal direction of the yarn.

11. The aggregate of nanofibers according to claim 1, that contains a functional chemical agent.

10        12. A fibrous material that includes the aggregate of nanofibers according to claim 1.

13. The fibrous material according to claim 12, wherein mass per unit area of the fiber is in a range from 20 to 2000 g/m<sup>2</sup>.

15        14. The fibrous material according to claim 12, wherein the aggregate of nanofibers is encapsulated in a hollow space of a hollow fiber.

15. The fibrous material according to claim 14, wherein the hollow fiber has multitude of  
20        pores measuring 100 nm or less in diameter in the longitudinal direction.

16. The fibrous material according to claim 12, that contains a functional chemical agent.

17. The fibrous material according to claim 12, wherein the fibrous material is selected  
25        from among yarns, a wad of cut fibers, package, woven fabric, knitted fabric, felt, nonwoven fabric, synthetic leather and sheet.

18. The fibrous material according to 17, wherein the fibrous material is a laminated

nonwoven fabric made by stacking a sheet of nonwoven fabric that includes the aggregate of nanofibers and a sheet of other nonwoven fabric.

19. The fibrous material according to claim 12, wherein the fibrous material is a fibrous article selected from among clothing, clothing materials, products for interior, products for vehicle interior, livingwares, environment-related materials, industrial materials, IT components and medical devices.

20. A liquid containing the aggregate of nanofibers according to claim 1 dispersed therein.

21. A polymer alloy fiber that has islands-in-sea structure consisting of two or more kinds of organic polymers of different levels of solubility, wherein the island component is made of a low solubility polymer and the sea component is made of a high solubility polymer, while the diameter of the island domains by number average is in a range from 1 to 150 nm, 60% or more of the island domains in area ratio have sizes in a range from 1 to 150 nm in diameter, and the island components are dispersed in linear configuration.

22. The polymer alloy fiber according to claim 21, wherein the diameter of the island domains by number average is in a range from 1 to 100 nm and 60%, in area ratio, or more of the island domains are in a range from 1 to 100 nm in diameter of the island domains.

23. The polymer alloy fiber according to claim 21, wherein, among the island domains included in the polymer alloy fiber, 60%, in area ratio, or more of the island domains are in a section having a width of 30 nm in diameter of the island domains.

24. The polymer alloy fiber according to claim 21, wherein the content of the island component is in a range from 10 to 30% by weight of the entire fiber.

25. The polymer alloy fiber according to claim 21, wherein the sea component is made of a polymer that is highly soluble to an aqueous alkaline solution or hot water.

26. The polymer alloy fiber according to claim 21, wherein the island component has a  
5 melting point of 160°C or higher.

27. A polymer alloy fiber that is a conjugated fiber comprising the polymer alloy according to claim 21 and another polymer that are conjugated together.

10 28. The polymer alloy fiber according to claim 21, wherein the value of CR that is a measure of crimping characteristic is 20% or more, or the number of crimps is five per 25 mm or more.

15 29. The polymer alloy fiber according to claim 21, that has Uster unevenness is 5% or less.

30. The polymer alloy fiber according to claim 21, that has a strength of 1.0 cN/dtex or higher.

20 31. A fibrous material that includes the polymer alloy fiber according to claim 21.

32. The fibrous material according to claim 31, wherein the fibrous material is selected from among yarns, a wad of cut fibers, package, woven fabric, knitted fabric, felt, nonwoven fabric, synthetic leather and sheet.

25

33. The fibrous material according to claim 31, that includes the polymer alloy fibers and other fibers.

34. The fibrous material according to claim 31, wherein the fibrous material is a fibrous article selected from among clothing, clothing materials, products for interior, products for vehicle interior, livingwares, environment-related materials, industrial materials, IT components and medical devices.

35. A method for manufacturing a polymer alloy fiber through melt spinning of a polymer alloy that is made by melt blending of a low solubility polymer and a high solubility polymer, wherein the following conditions (1) to (3) are satisfied:

(1) the low solubility polymer and the high solubility polymer that have been weighed independently are fed separately into a kneader and are blended under molten condition;

(2) the content of the low solubility polymer in the polymer alloy is in a range from 10 to 50% by weight; and

(3) the melt viscosity of the high solubility polymer is 100 Pa · s or lower, or difference in melting point between the high solubility polymer and the low solubility polymer is in a range from -20 to +20°C.

36. The method for manufacturing a polymer alloy fiber according to claim 35, wherein melt blending is carried out in a twin-screw extrusion-kneader and length of a kneading section of the twin-screw extrusion-kneader is from 20 to 40% of the effective length of a screw.

37. The method for manufacturing a polymer alloy fiber according to claim 35, wherein melt blending is carried out in a static mixer and the number of splits carried out in the static mixer is  $100 \times 10^4$  or more.

38. The method for manufacturing a polymer alloy fiber according to claim 35, wherein shear stress generated between a spinneret orifice wall and the polymer by the melt spinning operation is 0.2 MPa or less.

39. A polymer alloy pellet that has islands-in-sea structure comprising two kinds of organic polymers of different levels of solubility, wherein the island component is made of a low solubility polymer and the sea component is made of a high solubility polymer, while melt viscosity of the high solubility polymer is 100 Pa·s or lower, or difference in melting point  
5 between the high solubility polymer and the low solubility polymer is in a range from -20 to +20°C.

40. An organic/inorganic hybrid fiber that includes the aggregate of nanofibers according to claim 1 in a proportion of 5 to 95% by weight, wherein at least part of the inorganic material  
10 exists within the aggregate of nanofibers.

41. A fibrous material that includes the organic/inorganic hybrid fiber according to claim 40.

15 42. A method for manufacturing the organic/inorganic hybrid fiber according to claim 40, wherein the aggregate of nanofibers is impregnated with an inorganic monomer and subsequently the inorganic monomer is polymerized.

20 43. A method for manufacturing the fibrous material according to claim 41, wherein the fibrous material that includes the aggregate of nanofibers is impregnated with an inorganic monomer and subsequently the inorganic monomer is polymerized.

25 44. A method for manufacturing a hybrid fiber, wherein the aggregate of nanofibers according to claim 1 is impregnated with an organic monomer and subsequently the organic monomer is polymerized.

45. A method for manufacturing a fibrous material, wherein the fibrous material according to claim 12 is impregnated with an organic monomer and subsequently the organic

monomer is polymerized.

46. A porous fiber wherein 90% by weight or more of the composition consists of an inorganic material, while multitude of pores are provided in the longitudinal direction and mean  
5 pore diameter of the pores in the cross section in the minor axis direction is in a range from 1 to 100 nm.

47. A fibrous material that includes the porous fibers according to claim 46.

10 48. A method for manufacturing the porous fiber according to claim 46, wherein nanofibers are removed from the organic/inorganic hybrid fiber, that is made by impregnating the aggregate of nanofibers with an inorganic monomer and subsequently polymerizing the inorganic monomer, thereby to obtain the porous fiber.

15 49. A method for manufacturing a fibrous material according to claim 47, wherein nanofibers are removed from a material that includes the organic/inorganic hybrid fiber, which is made by impregnating the fibrous material that includes the aggregate of nanofibers with an inorganic monomer and then polymerizing the inorganic monomer, thereby to obtain the fibrous material.

20 50. A method for manufacturing a nonwoven fabric, wherein the polymer alloy fiber according to claim 21 is cut into fiber chips 10 mm or less in length, then the high solubility polymer is dissolved and then the fibers are assembled into a sheet without drying.

25 51. A method for manufacturing a nonwoven fabric wherein, after forming a nonwoven fabric or a felt that includes the polymer alloy fiber according to claim 21, the nonwoven fabric or the felt and a base fabric made of a low solubility polymer are bonded together, and then the high solubility polymer is dissolved.